

Appln. No.: 10/779,900
Amendment Dated February 25, 2005
Reply to Office Action of September 27, 2004

GRY-118US

Remarks/Arguments:

Claims 1-9, which represent all pending claims in the application, are rejected. Claims 1, 3, 4, and 6 are amended herein to address various claim rejections and to facilitate prosecution. Claim 10 is newly added. Support for the claim amendments and the newly added claim is found throughout the specification and specifically in paragraphs [0025] - [0029], Figures 3-6, and in the claims themselves. No new matter is added.

Specification Objections

Section 1 of the Office Action recites that the disclosure is objected to because in line 2 of paragraph [0010], numeral "106" should read "109"; in line 2 of paragraph [0070], numeral "704" should read "709"; and in line 1 of paragraph [0071], numeral "704" should read "709". The specification is amended herein as set forth in Section 1 to correct these informalities. Accordingly, Applicant requests that the objection to the specification be withdrawn.

Claim Objections

Section 2 of the Office Action recites that line 3 of claim 3 and line 3 of claim 4 should each read includes rather than including. Claims 3 and 4 are amended herein as set forth in Section 2 to correct the informalities. Accordingly, Applicant requests that the objections to claims 3 and 4 be withdrawn.

Section 3 of the Office Action recites that there is insufficient antecedent basis for the limitation "these branches" in claim 6. Claim 6 is amended herein to recite "three branches" rather than "these branches" to address the rejection. Support for the claim amendment is found in Figure 7 and in the specification at paragraph [0070]. Accordingly, Applicant requests that the objection to claim 6 be withdrawn.

Claim Rejections Under 35 U.S.C. § 102

Claims 1, 2, 5, and 7-9 are rejected under 35 U.S.C. § 102(b) as anticipated by each of U.S. Patent No. 6,334,413 to Hattori et al. (herein Hattori) and U.S. Patent No. 5,915,347 to Yanai et al. (herein Yanai). Applicant amends the claims herein to overcome the rejections.

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Hattori is directed to an electromagnetic actuating system for actuating a valve member. The electromagnetic actuating system includes an armature that moves with the valve member, an electromagnet that attracts the armature when supplied with current, and a spring that presses the armature away from the electromagnet. A permanent magnet exerts magnetic attracting force between the armature and the electromagnet. A current controller supplies a release current to the electromagnet so that magnetic flux is generated in a direction opposite to the direction of the magnetic flux generated by the permanent magnet to release the armature from the electromagnet.

Yanai is directed to a valve driving apparatus that uses an electromagnetic coil to move a valve body to close a valve coupled to the valve body with reduced noise. In Yanai, a current supplied to the electromagnetic coil is controlled to generate an electromagnetic force that drives the valve body. The current supplied to the electromagnetic coil is controlled such that it is rapidly decreased when the valve body approaches the end of a stroke to reduce the shock and, in turn, the noise generated when the valve closes at the end of the stroke.

Claim 1 as amended includes as least one feature that is neither disclosed nor suggested by Hattori or Yanai, either alone or in combination, namely:

Electromechanical valve actuator for internal combustion engines, equipped with a polarized electromagnet and with a mobile magnetic plate switching between a first position close to the electromagnet and a second position remote from the electromagnet, the switching times between these positions being determined depending on the operating state of the engine, comprising means for supplying the electromagnet with a progressively variable attracting current in the course of the approach of the plate to the electromagnet.

Hattori is devoid of any teaching or suggestion of an attracting current that varies progressively in the course of the approach of a plate to an electromagnet. In Hattori, the coils are either energized or de-energized. For example, as seen in Fig. 2B of Hattori, a square shaped impulse is supplied as a "release" current in order to cancel the attracting force exerted by a magnet that attracts the armature. Thus, Hattori teaches the use of attracting currents that are constant, rather than progressive as set forth by claim 1. Accordingly, since claim 1 recites a progressively variable attracting current and Hattori only teaches constant currents, Hattori does not disclose, teach or suggest each and every limitation of claim 1 as amended. Accordingly, Applicants contend that claim 1, as amended, is allowable over Hattori.

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Yanai does not disclose, teach, or suggest an electromechanical valve actuator equipped with a polarized electromagnet apprising means for supplying the electromagnet with a progressively variable attracting current in the course of the approach of the plate to the electromagnet. First, Yanai only discloses the use of non-polarized electromagnets and, therefore, is devoid of any teaching or suggestion of using polarized electromagnets. Second, as disclosed in Yanai at column 5, lines 14-19, which were cited by the Examiner, "...the current supply... sharply decreases when the plunger 22 moves to a position close to the close position or the open position..." This is unlike the claimed invention in which a progressively variable attracting current is supplied to an electromagnet in the course of the approach of the plate to the electromagnet. Thus, Yanai does not disclose each and every limitation of amended claim 1.

The invention as presently claimed takes advantage of the increased sensitivity and of the increased range of control of the polarized activator as described in the specification as originally filed at paragraphs [0027] and [0028]. This feature is not suggested by Hattori, which shows a square shaped pulse, nor by Yanai which, on the one hand, relates to a non-polarized electromagnet, and, on the other hand, describes a sharp decrease of the attracting current.

Accordingly, for the reasons discussed above, Applicants contend that claim 1 is allowable over the applied references and, therefore, request that the rejection of claim 1 be withdrawn. Claims 2, 5, and 7-9 include all the features of claim 1 from which they depend. Thus Applicants contend that claims 2, 5, and 7-9 are also allowable over the art of record for reasons set forth above and request that the rejection of these claims be withdrawn.

Claim Rejections Under 35 U.S.C. § 103

Claim 3 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Hattori or Yanai in view of U.S. Patent No. 6,532,919 to Curtis et al. (herein Curtis). Claim 4 stands rejected over Hattori in view of Curtis and claim 6 stands rejected over Hattori in view of U.S. Patent No. 5,111,779 to Kawamura (herein Kawamura). Claims 3, 4, and 6 each depend from claim 1 and, therefore, include all the limitations thereof. Further, the shortcomings of Hattori and Yanai, which result in claim 1 being allowable, are not remedied by the addition of Curtis and/or Kawamura. Namely, none of these references discloses, teaches and/or suggests

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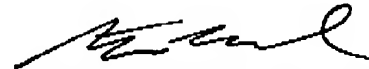
electromechanical valve actuator with a polarized electromagnetic comprising means for supplying the electromagnet with a progressively variable attracting current in the course of the approach of the plate to the electromagnet. Accordingly, Applicants contend that claims 3, 4, and 6 are allowable for at least this reason and request that the rejection of these claims be withdrawn.

Additionally, claim 6 is directed to an actuator with an "E" shaped support having three branches and includes a magnet located at the end of one of the branches. None of the art of record teaches a magnet located at the end of a branch of one of the electromagnets. The Office Action recites that Kawamura teaches such a feature. As clearly shown by the Figures in Kawamura, however, magnets are located against the inner face of a structure and not at the end of a branch. Accordingly, the art of record does not disclose, teach and/or suggest this additional limitation of claim 6. Therefore, Applicants contend that claim 6 is allowable for this additional reason.

Conclusion

In view of the amendments and remarks set forth above, the above-identified application is in condition for allowance, which action is respectfully requested.

Respectfully submitted,



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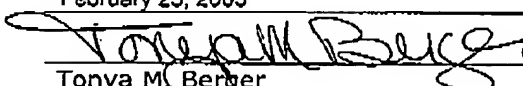
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